Socio-technical Systems for Connecting Social Knowledge and the Governance of Urban Action

Dr Susu Nousala

Spatial Information Architecture Laboratory (SIAL) RMIT University, Melbourne Australia; Susu.Nousala@rmit.edu.au

Dr William Hall

Australian Centre for Science, Innovation and Society and Engineering Learning Unit, University of Melbourne: billhall.athome@gmail.com

Assoc. Prof. Roger Hadgraft

Director, Engineering learning unit (ELU) University of Melbourne: Roger.Hadgraft@unimelb.edu.au

ABSTRACT

This paper seeks to expand our focus to understand how communities can assemble and manage knowledge to support more rational decisions regarding government services and actions in the community environment. We focus on the knowledge transfer interface between communities and urban councils, with a view to extending theoretical understanding of such transfers, and the socio-technical knowledge support systems interfacing between action groups and councils.

1. Introduction

In a world facing global warming and growing scarcities of water, power, mineral and food resources, there is reason to be concerned with the design and practicality of socio-technical systems for multi-level governance. These systems form the interface between people’s urban systems and their physical environment. These are complex systems that are co-manage with constrained activities typical of urban and regional administrative juggernauts. The work is informed by several years’ experience researching theory, technology and practice of building and managing tacit and explicit knowledge in hierarchically complex organizational systems. This paper discusses the trialing of Google Apps as knowledge management tools for community action groups creating links within, between and beyond groups and their networks with a view to understanding practical connectivity, crucial for sustainable social networked structures.

2. Background

Humanity’s growing population makes ever increasing demands on limited resources of our planet that we need for survival, more and more people are moving into urban environments where their impacts on the world environment are greatest. Folke (2006) emphasizes that human societies with their interconnected economies rely on what are called ecosystem services and support for survival. According to Folke “a major challenge is to develop governance systems that make it possible to relate to
environmental assets in a fashion that secures their capacity to support societal development.... It will require adaptive forms of governance”. Brondizio (et al. 2009) makes the case that such adaptive governance needs to be multilevel to build and maintain capital assets necessary to manage and sustain environmental affordances over time. Such capital assets are physical (i.e., built infrastructure), human (i.e., acquired knowledge and skills), and social (“value of institutions as a form of social capital formed through diverse processes involving the development of trust, norms of reciprocity, and networks of civic engagement, including the rules and laws within and between levels of organizations”). In the framework summarized by Brondizio et al’s “social capital” is adaptive knowledge embodied in the connections and capabilities of multiple levels of organizational structure, i.e., what Nelson & Winter (1982) called “organizational tacit knowledge”. Berkes (2009) makes many of the same points and stresses that multiple levels of social organization need a knowledge sharing framework that allows all levels to be rationally involved in “co-managing” the resources. The research discussed in this paper has been concerned with the analyzing and designing of knowledge sharing frameworks that would make co-management possible and effective.

3. Theoretical and Practical Framework

3.1 Framework Background
The theoretical and practical framework has emerged from an “invisible college” (Kuhn 1970) interested in the Theory, Ontology and Management of Organizational Knowledge (TOMOK). TOMOK’s theory combines evolutionary epistemology and autopoiesis to understand knowledge in hierarchically complex (i.e., multilevel) systems. The project and case study frameworks, have to date, combined three major threads of TOMOK’s work approach:

- **Technology implementation and practice:** Hall (2001; 2001a; 2003a 2006b, 2010a,), Hall et al. (2002), Hall et al. 2002a, Hall and Brouwers (2004), Hall et al. (2010), Hall and Best (2010).

The research and projects focused on what interfaces were required between urban and regional governing bodies and community groups (where local community knowledge may be transferred and used by decision makers to produce better results). The work also focused on emergence and the roles of communities in generating and sharing tacit knowledge, and making it explicit within larger organizational structures. Finally, the research focused on the pragmatic design and implementation of collaborative authoring systems in hierarchically complex organizational environments.

3.2 Theoretical Framework Discussion
The Nobel laureate Herbert Simon (1947; 1979) argued administrators can never make perfectly rational decisions. Rationality is
bounded by cognitive limits on how much knowledge/information a mind can acquire, hold and process in the limited time available to make decisions. The best that can be done is to maximize the availability and quality of information to produce the knowledge needed and minimize overloading decisions with irrelevant information. However, it is the nature of administrative systems that decision makers are often hierarchically and geographically far removed from problem situations they manage. In other words, committees or individual administrators making decisions about local issues affecting people often have too little appropriate knowledge, and what they have is probably out of date and/or irrelevant. On the other hand, local inhabitants encounter problems directly and probably either have or can easily acquire the kind of detailed local knowledge for proposing solutions, which need to be incorporated to be effective. Unfortunately, existing bureaucratic systems provide few effective links between decision makers and sources of real-world knowledge they need to maximize the rationality and effectiveness of their decisions. Similar arguments can be made regarding the implementation of administrative decisions in the environment. With appropriate administrative support, local individuals could apply solutions, or at the very least be apart of the process.

3.3 Practical Frameworks Discussion
Past studies of various knowledge-based groups have been known as “communities of interest” or “communities of practice” and are found within larger organizations. In the urban or governmental domains such emergent communities are often known as “action groups”. People in action groups have or can easily acquire significant amounts of personal knowledge and documentation relating to their areas of concern (Smith 2010; Smith and Nair 2010; Hocking and Wyatt 2010; Kuruppu 2010). Organizational knowledge managers need to work towards implementing social and technological systems that help collect, transform and make such knowledge available in usable forms for decision makers. The literature survey suggests that most research into relationships between government and community groups have had a top-down focus, i.e., where governments seek to push information (e.g., on health issues) into the community.

Another example of the nature of usability of pooled personal knowledge comes in the form of communities or action groups. In the field of cultural heritage, actions in the 80s and 90s utilized digitalization of artifacts as a method for preservation and transferring cultural information to the public and a multitude of interested groups. A decade later, and with the benefit of hindsight, more is understood, and its local knowledge and interaction that enhances these cultural collections that act as a focus for virtual communities of practice.

4. Field Work
The field work involved working with community action groups to identify the kinds of knowledge they were actually holding (Nousala and Jamsai Whyte 2010 Smith 2010, Smith and Nair 2010, Vines et al. 2010) and tested for utility of social technologies such as Google’s cloud applications for community knowledge building and sharing (Hall 2010, Hall and Best 2010, Hall et al. 2010). This work followed experiences from 2007-2008 in building a knowledge base to support
reference literature and working drafts for the TOMOK group, using a collaboration platform known as BSCW (OrbiTeam's Basic System for Collaborative Working). The BSCW platform was abandoned due to hosting and server issues. In January 2010, following the announcement that Google Docs could manage all kinds of document file formats, TOMOK was subsequently successfully transferred. TOMOK’s extensive knowledge base as a wiki using Google Apps, proved so successful that a subsequent trial used the tools as a support system for a knowledge intensive community action group (Hall et al., 2010). The demonstration template (Hall and Best 2010) offered a range of capabilities to support community action: e.g., data collection with the capacity for imaging and geo-tagging, data aggregation, building knowledge bases from specific literature, collaborative authoring with document tracking capabilities, presentation development, social networking, membership management, financial tracking and the like.

5. What has been learned so far...
Urban councils and their delegates are responsible for providing services necessary for civil life, maintaining peoples’ health and amenities. To do this functionaries need to know who, what, where, when, why and how-to relate to problem areas. Hall, Nousala and Best (2010) discuss epicyclic knowledge acquisition through building and acting in urban environments. Figure 1 shows the epicyclic knowledge concept built on from ideas from Hall (2003; 2005), Nousala (2006), Vines (et al 2007;2010) and Hall and Nousala (2010a). Figure 1 illustrates the theoretical application of the epicyclic knowledge framework to illustrate the acquisition, of building and acting in the urban environment. The knowledge related concepts in this paper have been informed by knowledge-based autopoietic systems at least three nested levels, highlighted by the discussion in the accompanying text of figure 1:

- Individual people (“I”). When concerned about a problem individuals are motivated to collect explicit knowledge eg; documents, images, maps, records, etc building personal knowledge in the process. This knowledge building may involve cycles of Observing, Orienting, constructing Tentative Theories, and acting to Eliminate Errors (Hall et al. 2010).

Figure 1. Knowledge cycles in urban governance (derived from Vines et al. 2010). Noosphere is the sum of human knowledge. Individuals, groups and councils all draw from and add to this store of knowledge as consequences of their activities.

- Community action groups (“WE”). Where individuals in the community face similar problems, they may share concerns and knowledge to stimulate the emergence of a community group (Nousala and Hall 2008) to resolve the problem. Group knowledge building may involve sharing personal knowledge and building a group repository of documentation and observations. The success and sustainability...
of the group will depend to a considerable degree on the success of the personal interactions in assembling useful knowledge and action plans (Hall et al. 2010).

• Councils ("THEM"). Councils are complex bureaucracies, organized into departments responsible for problem areas. Decisions to formalize actions tend to be centralized, where the bounds to rational decision making are likely to be the greatest (Hall et al. 2009). Committees or officers making decisions often have little or no personal knowledge of specific problems. Groups close to the problems can play important roles by collecting, organizing and presenting their collective knowledge in formats easily used by functionaries (Hall et al. 2010).

Noosphere described by Krippendorff (1986) as the space occupied by the totality of information and human knowledge collectively available to man. As discussed by Hall (et al 2010) the concept of Noosphere initially emerged from discussions between Valadimir Vermaoisky (who also coined the term “biosphere”), Teilhard de Chardin, and Edouard Le Roy. Hall (et al 2010) goes on to discuss how Turner (2005) reviewed to enhance the concept in such a way so as to make it possible to employ it in figure 1, meaning “...the noosphere is the net product of the global diversity of knowledge ecologies…” (Hall et al 2010).

6. Conclusion
Surveying of the literature shows that social technology has most frequently been used to push information from higher-level governance into the community. Very few works were found that demonstrated the social technologies gathering and communication information to higher levels of governance. This included the lack of involvement of community groups in areas of governance that affect them directly. Based on experience to date, the freely available Google Apps have offered a platform for directly interfacing community action into the processes of urban governance.

References
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